Title: TOXIC IMPACTS OF HAB TOXINS

MILESTONE SHC 2.5.2: *Transfer technology, tools, and knowledge related to harmful algal bloom events to assist communities, resource managers, and health officials.*

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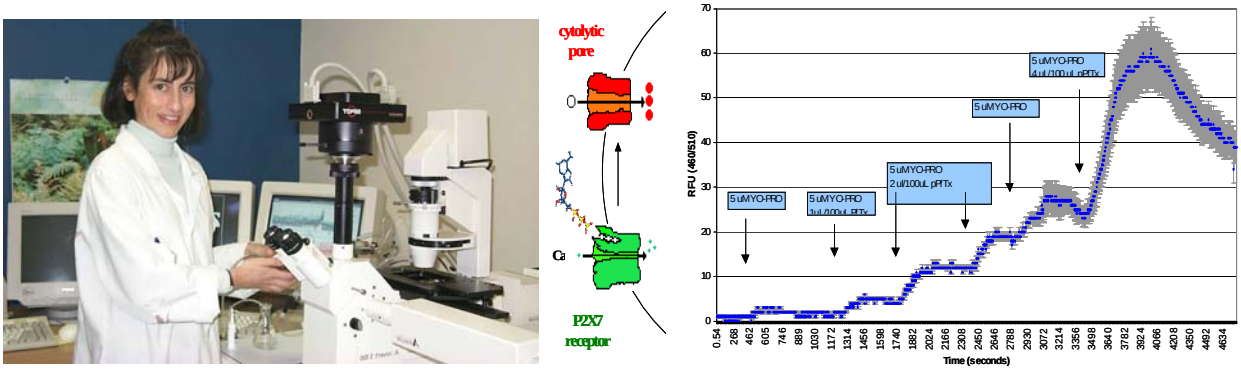
EXTERNAL COLLABORATORS: North Carolina State University, U.S. EPA Health and Environmental Effects Laboratory

OBJECTIVES OF RESEARCH ACTIVITIES: Identify and characterize adverse effects of HAB toxins and those populations at high risk in order to promote effective management of marine resources, protected species and public health.

DESCRIPTION OF RESEARCH ACTIVITIES: These research activities identify impacts of HAB toxins, including *Pfiesteria* toxin, domoic acid, brevetoxins, and domoic acid on immune, neurological, cardiovascular function and embryo development, as well as, characterize toxin receptors and signaling pathways. The data is used to develop effective management policies to public health agencies through identifying populations at risk and effective strategies

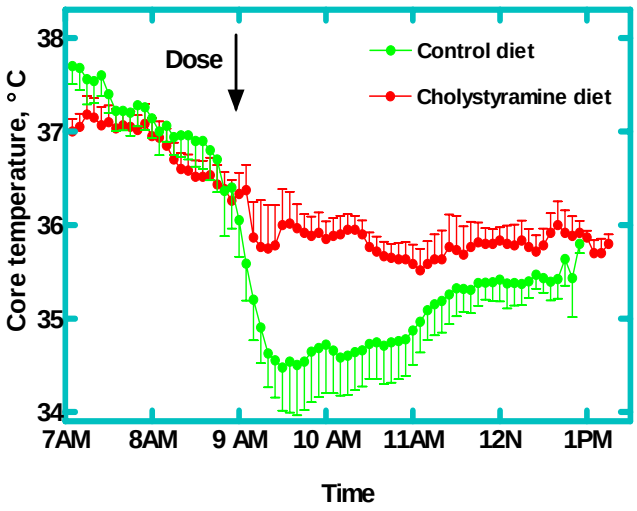
Graphic/Image/Figures



Attofluor analysis of *Pfiesteria* toxin effects on ion channels in mammalian cells (refer to publication by Melo et al.)

Selected Highlights

Collaborative studies were initiated in 2002 to examine the efficacy of a therapeutic treatment for marine toxin illnesses. Preliminary results from clinical studies have indicated that the cholesterol lowering drug, choestyramine reduces symptoms of several fungal and algal toxin disorders. Work in collaboration with the U.S. EPA laboratory in Research Triangle Park, incorporated cholestryamine into the diet of laboratory mice, which were then exposured orally to brevetoxin. The cholestryamine treated animals did not show the characteristic decrease in core body temperature, or at higher brevetoxin doses overt signs of toxicity.



Publications

Publications/Reports:

Melo, A.C., P.D.R. Moeller, Glasgow, Jr., J.M. Burkholder and J.S. Ramsdell. 2001. Microfluorimetric Analysis of a purinergic receptor (P2X7) in GH4C1 rat pituitary cells: Effects of a bioactive substance produced by *Pfiesteria piscicida*. Environmental Health Perspectives, 109, Suppl. 5, 731-738.

Van Dolah, F.M., Roelke, D., Greene, R.M. 2001. Health and Ecological Impacts of Harmful Algal Blooms: risk assessment needs. Human and Ecological Risk Assessment 7: 1329-1345.

Bottein Dechraoui, M.-Y. and Ramsdell, J. S. (2002). Sodium channel isoform-specific toxins, implication for toxicological analysis. In: Toxines et Recherches Medicales, Elsevier Eds. (*in press*)

Bottein Dechraoui, M-Y. and J.S. Ramsdell. Type B brevetoxins show tissue selectivity for voltage dependent sodium channels: Comparison of brain, skeletal muscle and heart sodium channels expressed in human embryonic kidney cells. (*submitted*)

Presentations:

Fairey, E.R. The red tide toxin brevetoxin, induces embryo toxicity and developmental abnormalities. 21th Annual Meeting of the Society of Environmental Toxicology and Chemistry, 2001. Baltimore, MD

Dover, S. M., Anna Clara Melo, Marie-Yasmine Bottein Dechraoui, Steve L. Morton, Howard B. Glasgow, Jr., Peter D.R. Moeller, JoAnn M. Burkholder and John S. Ramsdell. Release of interleukin 1-β from activated macrophage cells: A potential immunotoxic effect of *Pfiesteria* toxin. Xth International Conference on Harmful Algae, 2002. St. Petersburg, FL

Gordon, C.J, Beth Padnos, Edward Smith, Marie-Yasmine Bottein Dechraoui, Ricky Woofter, Stacie M. Dover and John S. Ramsdell. Oral exposure to brevetoxin in mice: Protective effects of cholestyramine. Xth International Conference on Harmful Algae, 2002. St. Petersburg, FL